1) Without knowing what the permit conditions would be a plant design cannot be accurately estimated. The group concluded that the BLM should wrestle with the permit issue – not only who or what entity would need to obtain the permit but also if a permit could be avoided, or what the constraints would be on the permit. Could an AOC replace a permit and what happens if politics should change.
2) If the information about permit conditions is not available the treatment scenario would need to be based upon stream standards (at A72). CC48 and A72 would be the monitoring points used to determine remediation effectiveness. These stardards are seasonal (monthly) and therefore the plant should be designed around this seasonal component to treat variable flows or partial flows as when needed.
3) Two alternatives should the primary basis for design and cost estimates: a) treatment of low flow, high concentrations drainages (+ or – five mine drainages), and b) treatment of high flow, low concentrations (Cement Creek above CC18).
4) Location alternatives should be included.
5) Cost estimates should include capital cost and O & M. Reduce these to cost/# of metal(s) removed.
6) Consensus was reached that adequate water quality information exists for the TBA below CC18; Bob Owen's Cement Creek analysis and Briant Kimball's tracer studies both indicated that by far the most metal loading other than Al and Fe occurs above the S. Fork confluence. Otis modeling was reviewed as well.

Consensus was reached that the location of the treatment plant should be near Gladstone; treating discharges or Cement Creek above the confluence of S. Fork (however the piping of Evelyn, Joe and John, and Lark were not eliminated). Evidence supported that little metals loading occurs below Gladstone except for iron and aluminum which are mostly attributed to natural sources.

printed 05/24/05 from RWG notes Bill Simon 05/23/05

Raymond H Johnson
<rhjohnso@usgs.gov>
04/01/2005 10:08 AM

To wsimon@frontier.net
cc Sabrina Forrest/EPR/R8/USEPA/US@EPA, Rob Robinson <rob_robinson@blm.gov>
bcc
Subject

Hi Bill,

Here are my comments on the TBA proposal for the Gladstone water treatment operations:

I think the full TBA proposal has a good overall scope of work, but the planned 3 page "pre-proposal" is a better way to get the project initiated.

Under the TBA objectives on the first page, at the end of "locations of discharges and water quality", I would suggest adding (past, current, and future conditions will be evaluated).

I would suggest that task 3 become task 2 and vice versa. This provides for the collection and evaluation of data before the development of a work plan and cost estimate.

I would also suggest the addition of a task 2 1/2 (you can adjust the numbers as necessary) as follows:

Task 2 1/2: Assessment of future metal loadings in Cement Creek above Gladstone to assist in the treatment design selection

Provide an assessment of possible changes in metal loads to Cement Creek due to a) the possibility that the mine pool and surrounding ground water conditions are not yet at equilibrium and b) climatic and seasonal variations in precipitation, which would affect surface water flows, ground water recharge rates, and future mine pool and surrounding ground water conditions. This assessment will include a prediction of future metal loads due to mining versus non-mining related sources and surface water versus ground water components. An evaluation of prediction uncertainties will also be included.

I would see the USGS role focusing on Task 2 1/2 and in the present Task 3 points relating to a) presenting mine workings and geologic cross-sections to identify potential locations of mine pool seeps and b) identify expected types and ranges of concentrations of contaminants from mine sources to be treated.... Point b in Task 3 could be rolled into Task 2 1/2. Although the USGS funding looks bleak, I will try to sell these ideas internally and keep an eye out for other funding sources.

Feel free to distribute my comments to the rest of the stakeholders group if you think it is worthwhile.

Thanks,

Ray

****

Raymond H. Johnson
U.S. Geological Survey
Minerals Team
Denver Federal Center
P. O. Box 25046, MS 973
Denver, CO 80225-0046

Phone: 303-236-1885
Fax: 303-236-3200
E-mail: rhjohnso@usgs.gov
****

William Simon
<wsimon@frontier.net>
04/15/2005 02:37 PM

To Sabrina Forrest/EPR/R8/USEPA/US@EPA
cc
bcc
Subject RE:

So should I include the objectives and tasks once they're approved by the Stakeholders?

Hennis is going to use Debbie Coat- Tetra tech. He also offered her services to the County if they want to pursue the Walsh placer. The County took and wait and see position on Tod's request while supporting ARSG as long as it follows what I portrayed to them.

Thanks for the info - see you on Thursday. Bill

-----Original Message-----
From: Forrest.Sabrina@epamail.epa.gov
[mailto:Forrest.Sabrina@epamail.epa.gov]
Sent: Friday, April 15, 2005 10:25 AM
To: William Simon
Cc: bksilverton@frontier.net; sanjuancounty@frontier.net; rob_robinson@blm.gov; Holmes.Michael@epamail.epa.gov
Subject: Re:

Bill, I know of no limits regarding pages and supporting documentation or photos; just that the application guidelines that ask for the information we need are only 3 pages. Any appendices you provide that more clearly spell out the project needs, goals, and support you have will help it go through the review process more smoothly.

Do you have specific items on the agenda related to Brownfields that you want me to discuss in any depth? I have not heard from any of the Town or County folks about any of the possible projects in the County, or if they have any specific questions. However, Todd Hennis did give me a call and said that he had talked to the county about resubmitting his TBA application and said he had gotten their support. He mentioned a local contractor helping somehow to do the application. Had you heard anything from him, or do you know the status of the Herbert Placer TBA application?

I thought of another possible source of technical support - the EPA has a Brownfields Technology Support Center. I'm not sure if they could help us at this stage, but this might be another good link to bookmark for future reading.
http://www.brownfieldstsc.org/

I understand Carol and Russ will be down to discuss Trout Unlimited too. See you next Thursday evening - I will ride down with Rob Robinson.

Sincerely,

Sabrina Forrest
999 18th Street, Ste. 300
Mail Code: 8EPR-B
Denver, CO 80202-2466
ph: 303.312.6484
fax: 303.312.6955

E-mail: forrest.sabrina@epa.gov

William Simon
<wsimon@frontier
.net>

04/15/2005 08:52
AM

To: Sabrina Forrest/EPR/R8/USEPA/US@EPA

cc:

Subject:

Sabrina, I'm working on the TBA application for Gladstone and plan on having a draft ready for next Thursday night meeting. Is it supposed to be maximum of 3 pages. Can there be appendices such as maps, budget, pictures, info on ARSG (participants), etc.? I don't have anything that describes the number of pages, format, etc.

Bill

DRAFT

Note: This document is DRAFT and may be missing critical elements that San Juan County and other stakeholders may need to provide. These draft TBA Objectives will be reviewed and more fully developed by San Juan County and the ARSG. EPA Brownfields staff believe a TBA application from the County would be well-supported by EPA management. EPA recommends that San Juan County and the ARSG may want to consider a phased approach to the TBA due to the potentially large scope of the treatment system project.

DRAFT TBA Objectives and Tasks
For
Gladstone Water Treatment System Modernization Options

Introduction

Based on the history of past operations, operators, and metals reduction at the discharge point and at the Cement Creek gauging station (CC48) in Silverton, the U.S. Environmental Protection Agency (EPA), Bureau of Land Management (BLM), and the Animas River Stakeholders Group (ARSG) would like to assist San Juan County in finding a means of funding a technical and legal feasibility study for restructuring and rebuilding a treatment plant that might not only treat the remaining discharge from the American Tunnel but also from other mines in the area, particularly the Gold King, Red and Bonita, Mogul, and Grand Mogul.

It was determined that BLM would look into the legal and ownership issues, since BLM has been found to actually own the portal entrance; discharges flows from where the American Tunnel ,EPA will support the effort by helping San Juan County develop objectives for a Targeted Brownfield Assessment application. **(Please note that EPA cannot write or submit the application on behalf of any applicant).** Based on EPA's February 3, 2005 conversation with County Administrator Willy Tookey, San Juan County is amenable to EPA's assistance in identifying possible TBA objectives for the Gladstone Water Treatment System. This document serves as a draft outline for project objectives.

The Gladstone Water Treatment System TBA objectives are:

- Conduct review of available literature, data, and mine maps to better understand mine workings, faults, with regard to the mine pool, locations of discharges, and water quality;
- Provide a technical assessment of the effectiveness and efficiency of the existing water treatment system;
- Identify and evaluate the pros and cons of an alternative system, including alternative locations;
- Provide conceptual designs for alternative systems and alternative locations, including sludge disposal sites;
- Evaluate feasibility for different treatment systems versus cost ranges (capital needed and long-term operations and maintenance) based on County and

Stakeholder expectations for the Cement Creek Redevelopment Corridor future uses, redevelopment plans, and water quality goals for the Animas River;

- Identify corridors for piping mine discharges to the treatment plant;
- Make suggestions of potential sources of funding for construction and O & M;
- Identify needs for additional study, development of a monitoring plan, and schedule for implementation.

Comment [I1]: Bill, Are there any options for piping discharge besides the County Road?

Specific Tasks to support the Gladstone Water Treatment System TBA objectives may include:

Task 1: Communicate with San Juan County and other stakeholders

- Identify and clearly document County's redevelopment plans and existing scenario(s) the County supports for the Cement Creek Redevelopment Corridor and details specific to the Gladstone Site and American Tunnel Water Treatment System.
- Determine where access agreements are needed from private land owners where TBA work may be completed
- Identify and clearly document private stakeholders' roles and responsibilities
- Help County and ARSG identify where ARSG can assist similar data collection efforts on federal parcels.
- Contact private landowners for access and additional site information, as needed.
- Meet with other stakeholders (ARSG BLM/USFS, EPA, USGS, DMG, mining companies, and private landowners).
- Explain and document land ownership within the area of interest and show on appropriate maps. County and BLM may be able to help with this task.
- Identify TBA site boundaries for Gladstone Water Treatment System. **NOTE: This may include other lands identified as possible alternative sites for relocation of a Water Treatment System. This may also include collection of other metals-laden seeps.**
- **Identify water treatment goals as they relate to the long-term Animas River water quality improvement objectives.**
- Compile existing maps and figures showing Water Treatment System TBA site and adjacent lands (Consider the order in which these activities need to be conducted. You may be able to simplify the tasks)

Comment [I2]: Mike Holmes added this and also referred to the mine pool for the American Tunnel plugs

Many of the above tasks have been accomplished, at least in part, and can be most easily done by ARSG participants. For this reason, it would be most practical to involve ARSG as sub-contractors, especially if match is required at any point.

Task 2: Complete Work Plan/Cost Estimate

- Phase III activities
  - Compile available Information and Data Evaluate the accuracy and completeness of available information and determine if additional data are needed.
  - Determine in cooperation with the State and other stakeholders the Wasteload allocation to be used in the proposed permit. This is basically goal setting.

- Prepare Field Reconnaissance
- Field Work
- Staffing
- Analytical Costs (may not apply; if applies, may be able to use EPA Region 8 lab for inorganic analyses. This would not include ultra low-level mercury analyses.)
- Evaluate existing Water Treatment System
- Evaluate design, location, and feasibility of different options for an alternate technology. (Note: this is basically an EE/CA
- Development of cleanup/remediation and sludge disposal needs if modernized plant were moved to a different location (currently SGC holds a reclamation permit for the existing plant – therefore they are responsible.
- Preparation of Report and Matrix showing design alternatives versus costs

Task 3: Collect and Present Background Information and Available Data

- Document historic and recent mining history as it relates to the Gladstone water treatment system.
  - Include status of mine reclamation permit and NPDES permit
- Collect available data from Bill Simon, Animas River Stakeholders Group; USGS Animas River Website; STORET and determine if other agencies or private owners have additional data that will support TBA study questions for the Gladstone Water Treatment System Phase III Options vs Cost Analysis Plan.
- Document known and potential hazardous substances located on site that may not have already been characterized, or have been potentially released from source area(s). If applicable, include descriptions of PCBs (transformers?), processing chemicals at Gladstone, and possible petroleum issues.
- Present maps of mine workings, geologic cross-sections to identify potential locations of mine pool seeps;
- Present applicable existing data for surface water, groundwater, mine sources, targets/receptors (bugs/wetlands/sensitive plant and animal species
  ⇒ Compile existing data from Excel spreadsheet using ARSG format.
  ⇒ What are the quantity and quality of data?_ NOTE: ARSG indicates all data met EPA QA/QC. There is a lot of data from the American tunnel and treatment discharge. At least one High and low flow sample event from all other mines in the area except Red and Bonita which has one high and low previous to new large discharge and one low flow sample since new large discharge began.
  ⇒ Determine what additional water quality monitoring data are needed; there are pre-bulkhead sealing data.
  ⇒ Identify expected types and ranges of concentrations of contaminants from mine sources to be treated by a modernized system versus water treatment goals. Relate them to the long-term Animas River water quality improvement objectives and TMDL's
  ⇒ Determine additional areas of contamination to be characterized; more data needed on Red & Bonita (1 – 2 sample events)
  ⇒ Determine volumes of material, e.g., sludge that will need removal.
  ⇒ Determine the area is needed for treatment plant.

Comment [I3]: Did you want this insertion to stay? Is this something we can discuss openly at the March 24th meeting?

Another comment from Mike Holmes is related to planning to monitor the mine pool from the American Tunnel Plug - this may be later phase, but include it as another bullet, if you want some planning to be done during the TBA

Comment [I4]: I don't think this activity would be irrelevant.

- Identify data gaps that require more sampling or other phases of study
- Organize any new data for addition to STORET and ARSG database.

Task 4: Site Reconnaissance

- Conduct site visit with appropriate stakeholders/landowners
- Evaluate condition of existing water treatment system
- Conduct on the ground evaluation of alternative locations or methods of treatment for a modernized system.
- Identify existing wetlands and potential locations for created wetlands to improve the water treatment system.
- Based on existing data, determine if any samples should be collected during recon to refine or revise the Conceptual Site Model and Project Study Questions.

Task 5: Develop Conceptual Site Model

- Develop project study questions
- Document data quality objectives for stakeholder group review prior to drafting a Phase III Options vs Cost Analysis Plan

Possible Study Questions may include:

- How many mining-related sources are impacting Cement Creek? **NOTE: ARSG indicates they have information that identifies these sources**
- How many inflows need collected and treated? **NOTE: ARSG has already identified the inflows, but this may be variable depending upon EE/CA**
- What is the total volume of water to be managed and treated if other sources are included. (Gladstone ponds have 2.1 millions gallons capacity
- What volume of solids need managed?
- Where will solids go; what other volume of material needs transported offsite?
- For alternative location(s), could environmental or human health targets be impacted?
- Is the site appropriate and safe for redevelopment / reuse as planned by the County/TBA Applicant?
- What are the best design (and possible location(s) alternatives for the Gladstone system?
- What additional phase(s) of study are needed; for example, determine if/when the mine pool reaches equilibrium; identify data gaps in existing information in order to conduct more groundwater study; identify locations for additional monitoring wells; further characterize mine pool hydrology; development and implementation of a monitoring plan for the mine pool and additional sources.

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Comment [I5]: Bill, you may take these out, but I am trying to put as many of the possible questions out there that would be asked. I have added statement that indicate ARSG has info to help answer the study questions

Comment [I6]: I don't think that has been made clear to EPA. How do we know it has reached equilibrium? I think these are all valid possible objectives for other phases of study based on what EPA knows of the Cement Creek issues. Of course these are all subject to revision and discussion. And input from ARSG, Sunnyside, CDPHE, USGS, BLM is critical

Task 6: Preparation of Report and Matrix showing design alternatives versus costs

- Develop and distribute draft and final Phase III Options vs Cost Analysis Plan
- Submit to applicant (San Juan County); ARSG; landowners; other interested stakeholders, and EPA for review and comment
- If data are collected, include applicable QAPP elements and document 7 Step Data Quality Objectives Process to obtain usable data that meet the study objectives.
- Revise and finalize based on stakeholder comments
- Attend ARSG to discuss the final document

Task 7: Assist Applicant/County and ARSG, with Outreach and Community Involvement

- Attend ARSG meetings during the project performance period
- Determine which lands need other support
- Type of support needed:
  - Federal -EPA, BLM/USFS, USGS, USFWS (wetland determination support)
  - State – CDPHE,
  - Local – Town, County, ARSG,

Task 8: Data Management and Project Closeout

- Get new data into STORET and other databases for stakeholder use
- Ensure Applicant and other stakeholders have access to information generated during TBA by linking work products to the County or ARSG webpage.
- Work Assignment Closeout

Comment [I7]: Regarding removal of the CSU wetland reference - Might there be some duplication of effort if the CSU expert is planning to be doing wetland work up there that would be beneficial to what we want to do?

Mike
Wireman/EPR/R8/USEPA/US
03/10/2005 06:55 PM

To Sabrina Forrest/EPR/R8/USEPA/US@EPA
cc
bcc
Subject Re: Dft Final TBA scope for Gladstone

Sabrina - I think that it will be important to include some effort related to characterizing the hydrology of the mine pool, American Tunnel, Mogul tunnel, Grand Mogul and Bonita. This system needs to be understood to better predict the future treatment needs and to evaluate other ,potentially appropriate remedial elements.

Lorraine Willcutt -
review for Tom
confirmatory sampling

→

Tom - Budget to be added later.
Needs to be taken to commissioners tomorrow night
Comments welcome

DRAFT

Gladstone Treatment Plant Assessment
A Targeted Brownfield Assessment Project Proposal

WTP on private land discharges may be from public lands

PROJECT TITLE: Gladstone Treatment Plant Assessment

NAME, ADDRESS, PHONE, EMAIL OF LEAD PROJECT SPONSOR:
San Juan County, Box 466, Silverton, CO 81433
CONTACT PERSON: Willey Tookey
Phone: (970) 387-5766 **Fax**: **E-Mail**: sanjuancounty@frontier.net

Site/Project Location: Gladstone, Cement Creek Watershed, San Juan County, Colorado. See Vicinity Maps 1 & 2 of Appendix A.

This project includes assessing potential locations on both private and BLM lands for their potential for use of a centralized treatment facility. Treatment plant location analysis will involve approximately 20 acres. It will also assess the practicality of conveying to the facility and actively treating several draining mines in the vicinity of Gladstone. Draining mines and easements for pipelines to transport drainage to the treatment plant may involve as many as 100 acres in less than a three square mile area.

Taxes are currently delinquent on the Gold King Co. claims including the Gold King mine, the Mogul, Gran Mogul, and Red and Bonita mines, all which are ranked as high priority, low volume/high metal concentration acid mine drainages that need to be considered for inclusion in a treatment facility. The other mines considered are similar but are on BLM lands including the American tunnel, Joe and John, and Evelyn mines.

Current assessment value of the claims in minimal since they are assessed for mining purposes only at the present time. If discharges were treated the values would increase very substantially as they would be available for residential and/or commercial/industrial development. All claim are within one and one half miles of the new and expanding Silverton Mountain ski area.

cost / 16 months removed

Site History and Current Status

This project involves assessment for pollution reduction of several patented mine claims, BLM lands, and the ghost town of Gladstone in the Cement Creek Watershed, San Juan County, Colorado. Numerous historic, now abandoned, mines exist within a two mile radius of Gladstone. A few of these mines have acid mine drainage of volumes between 30 and 100 GPM containing very high concentrations of acid and dissolved metals. Gladstone has historically been the central location, and railroad terminus, for the milling and shipping of mine ores from this three square mile valley. In the 1960's the American tunnel was extended several miles northeast out of Gladstone to access the Sunnyside mine from below. The tunnel drained up to 1600 GPM from the mine. All ore from the American tunnel was transported out of Gladstone until the mines closure in

1600 gpm

loads

preserve - high volume, low-tech goal
Is important to fish: Mgrs' goal lbs/day

easements

1992. Milling had already ceased in Gladstone before the 1960's and after that Sunnyside ore was transported to the Mayflower Mill near Silverton. Sunnyside Gold Corporation (SGC) has removed or is in the process of removing any remaining mine wastes and tailings from historic mills (pre-1960) in Gladstone as part of their current reclamation permit termination requirements.

A lime feed and settling pond type treatment facility was constructed in Gladstone in 1979 by Standard Metals Corporation. The facility served to treat water discharging from the American tunnel, the main access into the Sunnyside Gold mine, as required by their discharge permit. The facility operations and mine ownership was later transferred to the Sunnyside Gold Corporation. Under jurisdiction of a court consent decree, SGC installed several bulkheads within the Sunnyside Mine which has greatly reduced the amount of discharge out of the American tunnel. Seventy to 100 GPM continues to discharge presumably from near surface, "natural" ground water flows. All terms of the consent decree were met by SGC. In January of 2003 the treatment facility and operations were transferred to Gold King Corp., which actually owns much of the land intersected by the American tunnel. Gold King continued to operate the treatment facility, treating the discharge, until September, 2003. Due to financial problems and the loss of the leased use of the property the settling ponds resides upon, Figure 1, the company quit treating the discharge. The plant is presently sitting idle for lack of funds to develop an adequate method to separate and dispose of the metal precipitates. Capitalization is needed for both a metal precipitation and concentration plant and continuous long term operation.

Figure 1: Gladstone Treatment Plant - Settling Ponds 1

Figure 2: Gladstone Treatment Plant - Limefeed

Discharge from the American tunnel is now considered non-compliant and the existing, first generation lime treatment plant, Figure 2, may or may not be adequate for future use depending upon an engineering analysis for a modern and complete process. Gold King Corp. has no financial ability to operate the plant and the properties containing the lime feed plant and settling ponds have been foreclosed upon, subject to a redemption period. Cement Creek, the receiving stream for the discharge of the American tunnel and other draining mines in the immediate area is unable to support aquatic life and only ambient water quality standards apply. Cement Creek is a major contributor of metals and acidity to the Animas River which has "goal-based" cold water aquatic life I standards. Presently 15 TMDL's are not being met in Cement Creek and the Animas River below Cement Creek's confluence. Cement Creek is the primary remaining target for metals and acidity reduction, necessary to bring the Animas River into Clean Water Act compliance.

Technology for active treatment plants has advanced in recent years. If newer technologies were employed improvement in cost efficiency of treatment and disposal of the American tunnel discharge could be realized. For instance, using the present lime feed system combined with a new smaller settling area, thickener, and filter press, a low volume solid brick of precipitates could be produced that could be disposed of in a more affordably way, such as in a landfill. The previous system hauled the sludge, containing 98% water, to an open tailings pond which is no longer available.

Due to the non-compliant status of the existing dormant treatment plant, various property owners and Animas River Stakeholders Group (ARSG) participants are anxious to re-development adequate treatment. The close proximity of the plant to other high impact draining mines and the necessity to meet downstream water quality standard goals provides a wonderful opportunity for a collaborative approach that could be enormously beneficial to the entire watershed, including recreational users, fisherman, irrigators, and the municipal water users of Durango, Aztec, and Farmington. A modernized treatment plant in the vicinity of Gladstone is likely to be the most cost efficient method of reducing metal and acidity loading to the Animas Watershed. The proposed assessment would determine the feasibility of the concept of potentially combining drainages of several mines, treatment technologies to be used, preliminary plant design, land acquisitions (if any) required, and capitol and operating costs.

No CERCLA or RCRA response action has been taken on any of the sites.

Property Specific Determinations

All draining mines throughout the Animas Watershed have been characterized and ranked with respect to one-another by their metals and acidity contributions. by the Animas River Stakeholders Group (ARSG). Several of the worse polluters of metals and acidity were found to be in the vicinity of Gladstone and would be considered as drainages for treatment in this assessment. Characterization analysis and feasibility for remediation determinations have been compiled in the Animas Use Attainability Analysis[1] by the ARSG.

Contamination by Petroleum or Petroleum Product

No known petroleum or petroleum product contamination exists on the current treatment site. Cite Camille report. Remaining mining and milling wastes are to be removed by SGC in 2005.

While metal contamination in Cement Creek is high, it is due to a combination of natural geological processes and acid mine drainage from mines in the vicinity of Gladstone. Contamination from metal mine processing (mine waste and mill disposals) in Gladstone is considered low to moderate. Sunnyside Gold Corporation (SGC) has already removed tens of thousands of tons of historical mine tailings and mine wastes and disposed of them in Tailings Pond #4 of the

[1] Simon, Wm., Butler, P., and Owen, R., 2001. Animas Use Attainability Analysis.

Mayflower Mill. In 2005 SGC will complete their permitted remediation by removing the sludge in the settling ponds, any other mine wastes, and buildings in order that their permit be terminated. Although parties responsible for remaining mine discharges and low level contamination do not exist, land owners and participants in the ARSG process are interested in collaborating to find a practical way to make further improvements.

San Juan County, the sponsoring agency, is not liable for any contamination on the site.

Project Period and Budget

This project will begin soon after we are notified of the grant award. ARSG has currently scheduled a special Remediation Work Group meeting for May 19th to complete the development of objectives and tasks for the assessment which will be provided to EPA and the chosen contractor. Appendix C, Draft Objectives and Tasks, lists project objectives and task; however these need to be further refined as many of the tasks have been partially or wholly completed.

Some of the initial assessment must be accomplished in the field. Our field season at this high elevation site is restricted by heavy snow accumulations and avalanches. Field work is generally limited to May or June through October, depending upon seasonal conditions. All other aspects of the program can be accomplished in the office. We hope that the assessment and final report should be completed by July, 2006.

Budget:

Assurance of Future Redevelopment and Reuse of the Site

The site for the treatment plant needs to be determined. The plant will likely be located on private and/or public lands associated with a draining mine. Any and all mine drainages piped into the plant will benefit from treatment. Therefore land values on the patented claims will increase and property owners will be able to use the property for development purposes whereas presently the liability associated with mine drainage inhibits investment.

OKAY TO HERE

A mix of public and private ownership presently exists on the American tunnel treatment site. Adding additional drainages from surrounding mines adds more complexity. During the period of the TBA assessment the BLM has agreed to simultaneously complete an investigation on various legal aspects of ownership and future operation of the treatment facility. We anticipate that San Juan County, the State of Colorado, or a quasi-public entity such as a special improvement district will be necessary to take on operation of the facility. The legal investigation will make recommendations on this critical aspect of the project.

San Juan County will act as lead sponsor for this program providing administrative oversight and a public forum. The Animas River Stakeholders Group has initiated this project and will remain as key advisors to the Board of County Commissioners, the County Administrator, and the TBA contractor. ARSG has developed a list of objectives and tasks, to be refined in May, that will focus the efforts of the chosen contractor. Through monthly public meetings the ARSG will provide valuable public education and an avenue for public input. The BLM, Division of Minerals and Geology, and WQCD among other local, State, and Federal agencies are active ARSG participants who will contribute expertise and project oversight and focus (Appendix A).

This project has been openly discussed for several months at ARSG and Board of County Commission meetings. Our local newspaper has reported on this development. Environmental advocacy groups and downstream water users are aware of the problems faced with the treatment plant being inoperative and will insist that positive steps be taken to bring discharges into compliance.

Although most funding sources will need to be identified after the feasibility determination it is anticipated that many entities will need to be involved. The BLM has recently requested $3 million for treatment plant development and operation. Presently they are committed to accomplish the legal assessment. The existing lime feed treatment facility, Figure 2, could be donated to our cause if we can act quick enough that it is not torn down as a requirement of the existing permit with DMG.

Benefits

1) Increased property valuations from decreased liability from draining mines on the project and adjacent lands.
2) Reduced metal and acid loading to Cement Creek and the Animas River. An active treatment plant may presently be the most cost effective method of treating high concentration, low volume acid mine drainage. The possibility of treating several mine drainages in one unit would be a significant step in the effort to meet TMDL's and water quality standards.
3) Significant health benefits would result from reduced metal concentrations for drinking water users in Durango, CO, and Aztec, Flora Vista, and Farmington, NM.
4) Resolution of a treatment facility would free other potentially available lands for commercial/residential development near the base of Silverton Mountain Ski Area. A substantial increase in winter recreational/tourist use would result.
5) Public lands would benefit from reduced metals pollution to area streams and wetlands. Aquatic life and aesthetic values would increase. Treatment of acid mine drainage would help restore the integrity, functions, and water quality of receiving streams and adjacent wetlands.
6) ARSG, San Juan County, and Silverton Mtn. Ski area are all involved in trail development in the Gladstone corridor. The corridor has been

targeted by the San Juan Planning Commission as a development corridor. The County has little room elsewhere to grow as this valley bottom is one of the few locations in the county that are accessible by motorized vehicles. The County and ARSG are presently involved with the Animas Conservancy in developing potential conservation easements for Gladstone and elsewhere in the County.

7) San Juan County is the poorest in the State and has the highest unemployment. This project will eventually provide construction and operation and maintenance jobs.

APPENDIX A

State and Federal Participants

BLM	Mine inventory, site characterization of BLM lands, development of pilot projects
BOR	Continued geochemical monitoring, site feasibility, remediation plan engineering
CCEM	Facilitator of the stakeholder process
CDMG	Site feasibility, remediation plan development, process engineering, 319 hydrological control remediation project in Mineral creek, Cement creek feasibility studies
CDOW	Biological surveys, development of bio-monitoring methodology, Riverwatch program
RIVERWATCH	Continued water monitoring (chemical analysis by DOW)
SWCD	(Southwest Water Conservation District) Funding for water monitoring, natural background loads, coordinator's position
USFS	Mine inventory and site characterization of FS lands, survey of Mineral creek priority sites
USGS	Water monitoring, studies to determine metal loading resulting from natural geologic processes, stream sediment transport and colloidal fate studies
WQCD	Water chemistry monitoring, statistical analysis, data base processing, GIS development

OTHER PARTICIPANTS

Animas Water Company	Salem Minerals	Steve Fearn, P.E.
City of Durango+	San Juan County +	Sunnyside Gold Corp.+
Friends of the Animas River	San Juan RC&D	Town of Silverton+
Gold King Mining Corp.	Shenandoah Mining Corp.	Tuscoe, Inc.

Mining Remedial Recovery Co.*

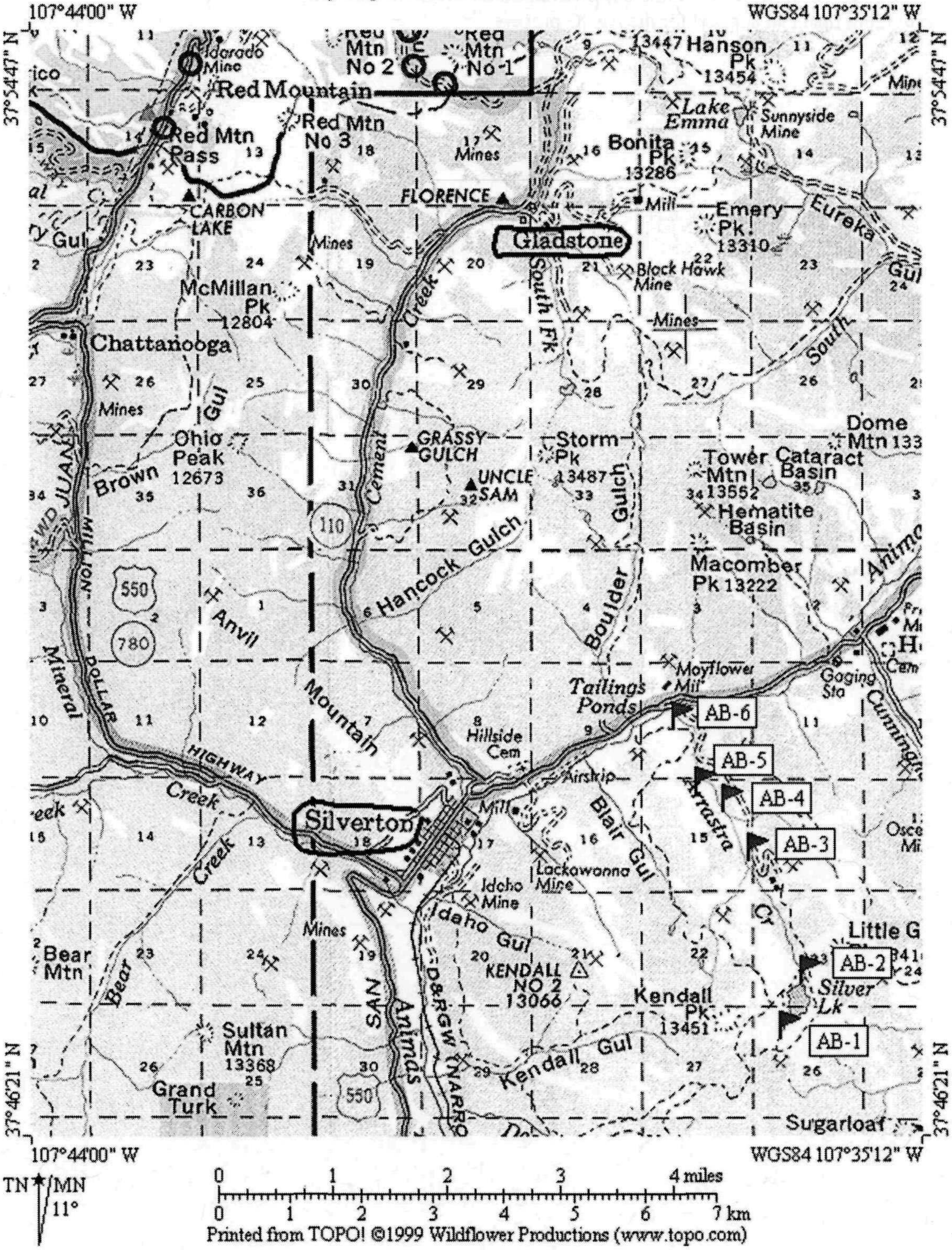
Silver Wing Mines+

* This company completed a mine drainage control demonstration project in the late summer of 1995 using private funds, supplemented by NPS 319 funding.

+ Providing financial support for the ARSG process

APPENDIX B

Vicinity Map 1: Silverton and Gladstone, Coloardo



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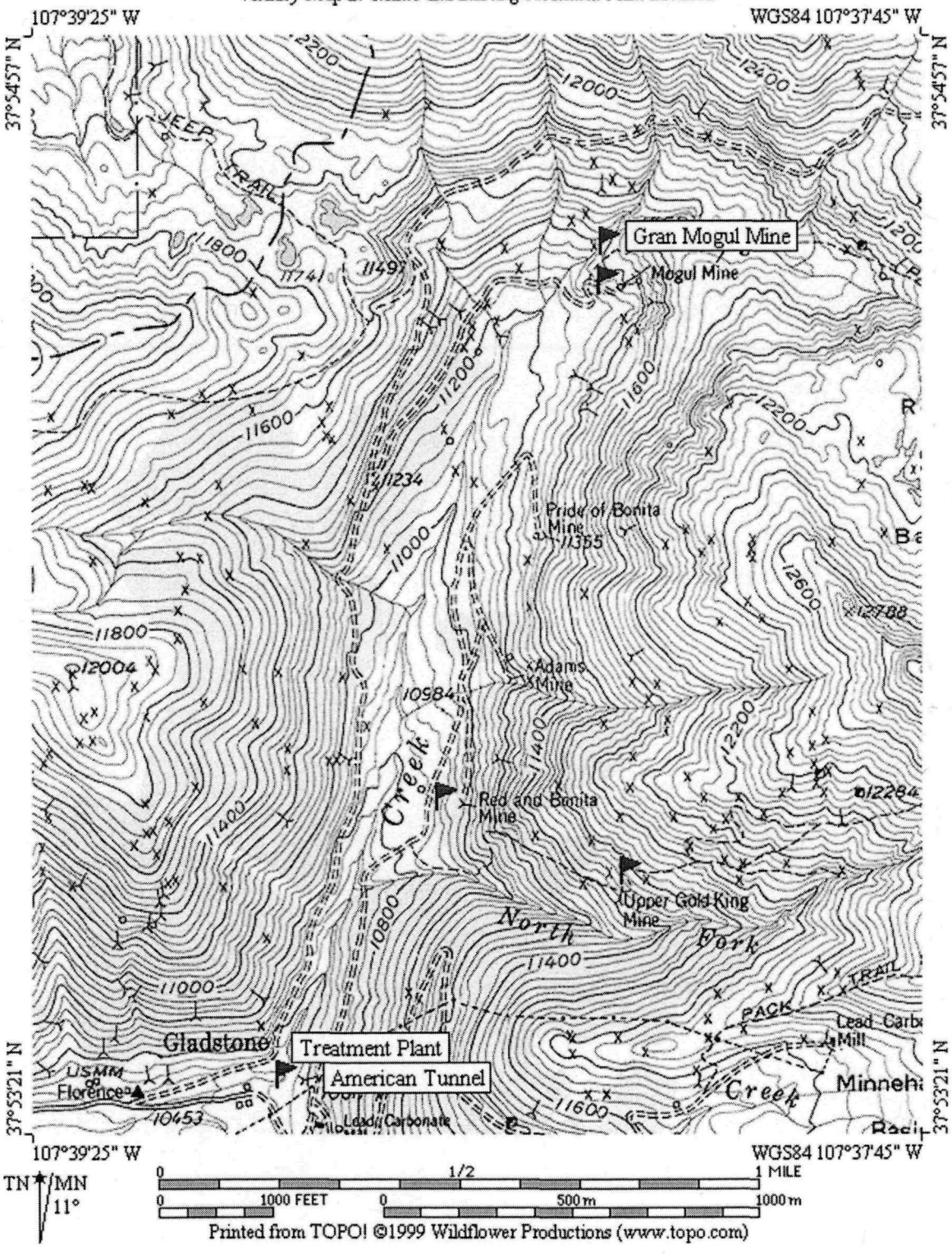
Vicinity Map 2: Mines and Existing Treatment Plant Location



Appendix C, Draft Objectives and Tasks

APPENDIX C

Objectives and Tasks
For
Gladstone Water Treatment System Modernization Options

Introduction

Based on the history of past operations, operators, and metals reduction at the discharge point and at the Cement Creek gauging station (CC48) in Silverton, the U.S. Environmental Protection Agency (EPA), Bureau of Land Management (BLM), and the Animas River Stakeholders Group (ARSG) would like to assist San Juan County in a technical and legal feasibility study for restructuring and rebuilding a treatment plant that might not only treat the remaining discharge from the American Tunnel but also from other mines in the area, particularly the Gold King, Red and Bonita, Mogul, and Gran Mogul.

It was determined that BLM would look into the legal operation and ownership issues of a treatment plant. BLM has recently been found to actually own the portal entrance of the American tunnel.

OBJECTIVES:

The Gladstone Water Treatment System TBA objectives are:

- Compile available literature, history, water quality data, and mine drainage data and surface ownership maps.
- Provide a technical assessment of the effectiveness and efficiency of the existing lime fed water treatment system;
- Identify and evaluate the pros and cons of an alternative system, including alternative locations;
- Provide conceptual designs for alternative systems and alternative locations, including sludge disposal sites;
- Evaluate the feasibility of different treatment systems versus cost ranges to maximize metal removal at minimal cost (capital needed and long-term operations and maintenance).
- Consider the costs and benefits that a water treatment facility would have on the Cement Creek Redevelopment Corridor and water quality and aquatic habitat improvements would have on the Animas Watershed
- Identify corridors for piping mine discharges to the treatment plant.
- Make suggestions of potential sources of funding for construction and O & M;
- Determine a monitoring plan and schedule for implementation

Rec. post, current & future conditions to be evaluated

Specific Tasks to support the Gladstone Water Treatment System TBA objectives may include the following. Details of each task are listed below.

Tasks

Task 1: Collaborate with San Juan County, Animas River Stakeholders Group and other stakeholders.
Task 2: Complete a Work Plan/Cost Estimate; refine Objectives and Tasks.
Task 3: Collect and Present Background Information and Available Data
Task 4: Site Reconnaissance
Task 5: Develop Conceptual Site Model
Task 6: Preparation of Report and Matrix showing design alternatives versus costs
Task 7: Assist Applicant/County and ARSG, with Outreach and Community Involvement
Task 8: Data Management, Reports, and Project Closeout

2 1/2 Assessment of future metal loads in CC above Gladstone to assist treatment design selection

Tasks with details

Task 1: Collaborate with San Juan County, Animas River Stakeholders Group and other stakeholders.

EPA Wireman, Holm, Forest hydrology of mine portal

- Identify and clearly document County's redevelopment plans and existing scenario(s) the County supports for the Cement Creek Redevelopment Corridor and details specific to the Gladstone Site and the re-development of a treatment plant.

- Identify and clearly document private stakeholders' roles and responsibilities

- Identify where ARSG can assist with data collection, monitoring, information compilation, access to sites, and land ownership

- Contact private landowners for access and additional site information, as needed..

- Identify TBA site boundaries for Gladstone Water Treatment System. **NOTE:** This may include other lands identified as possible alternative sites for relocation of a Water Treatment System. This may also include collection of other metals-laden seeps and adit drainage from other mines.

- Identify water treatment goals as they relate to the long-term Animas River water quality improvement objectives.

Many of the above tasks have been accomplished, at least in part, and can be most easily done by ARSG participants. For this reason, it would be most practical to involve the ARSG as sub-contractors.

Task 2: Complete Work Plan/Cost Estimate

- Phase III activities

  - Compile available Information and Data. Evaluate the accuracy and completeness of available information and determine if additional data are needed.

  - Determine in cooperation with the State and other stakeholders the Wasteload allocation to be used for plant design. (goal setting).

  - Field Reconnaissance

  - Staffing

  - Estimate Analytical Costs (may not apply; if applies, may be able to use EPA Region 8 lab for inorganic analyses. This would not include ultra low-level mercury analyses.)

  -
  - Evaluate existing Water Treatment System
  -
  - Evaluate design, location, and feasibility of different options for an alternate technology. (Note: basically an EE/CA)
  - Development of cleanup/remediation and sludge disposal needs.
  -
  - Preparation of Report and Matrix showing design alternatives versus costs

Task 3: Collect and Present Background Information and Available Data

- Document historic and recent mining history as it relates to the Gladstone water treatment system. Include status of mine reclamation permit and NPDES permit

- Collect available data from ARSG water quality data base for Cement Creek and the draining mines of interest. Determine if other agencies or private owners have additional data that will support TBA study questions for the Gladstone Water Treatment System Phase III Options/Cost Analysis Plan.

- Evaluate Katie Walton Day's (USGS) metal reduction modeling for Cement Creek

- Document known and potential hazardous substances located on site that may not have already been characterized, or have been potentially released from source area(s). If applicable, include descriptions of PCBs (transformers?), processing chemicals at Gladstone, and possible petroleum issues.

- Present applicable existing data for surface water, groundwater, mine sources, targets/receptors (bugs/wetlands/sensitive plant and animal species.

- Identify data gaps that require more sampling or other phases of study
- Evaluate QA/QC of data

- Organize any new data for addition to STORET and ARSG database.

Task 4: Site Reconnaissance

- Conduct site visit with appropriate stakeholders/landowners

- Evaluate condition of existing water treatment system

- Determine what additional water quality data are needed from streams and draining mines

- Identify expected types, volumes, and ranges of concentrations of contaminants from mine sources to be treated by a modernized system

- Conduct an evaluation of alternative locations and methods of treatment for a modernized system

- Review monitoring location and data to understand the effectiveness of the previous treatment plant at the discharge point and at the Cement Creek gauge (CC48).

- Identify existing wetlands and potential locations for created wetlands to improve the water treatment system ???

Task 5: Develop Conceptual Site Model

- Relate goals to the long-term Animas River 'goal based' water quality standards and TMDL's

- Develop or use previous Sample Analysis Plans, Quality Assurance Plans, and Data Quality Objectives.

- Determine the number, sources, and volumes of discharges (Cement Creek and discharging mines) that can be efficiently treated

- Determine the capacity of the plant and sludge volumes in need of disposal (we anticipate that a nearly dry product will need to be produced to keep disposal costs minimal).

- Determine water quality discharge goals for the treatment plant

- What is the total volume of water to be managed and treated if other sources are included. (Gladstone ponds have 2.1 millions gallons capacity

- For alternative location(s), could environmental or human health targets be impacted?

- Is the site appropriate and safe for redevelopment / reuse as planned by the County/TBA Applicant?

- What are the best design (and possible location(s) alternatives for the Gladstone system?

- Attend monthly ARSG meeting for public input

- Determine monitoring needs

Task 6: Preparation of Report and Matrix showing design alternatives versus costs

- Develop and distribute draft and final Phase III Options vs Cost Analysis Plan

- Submit to applicant (San Juan County); ARSG; landowners; other interested stakeholders, and EPA for review and comment

- If data are collected, include applicable QAPP elements and document 7 Step Data Quality Objectives Process to obtain usable data that meet the study objectives.

- Revise and finalize based on stakeholder comments

- Attend ARSG meetings to discuss the final document

Task 7: Assist Applicant/County and ARSG, with Outreach and Community Involvement

- Attend ARSG meetings during the project performance period

- Determine which lands need other support and type support needed.

Task 8: Data Management and Project Closeout

- Get new data into STORET and other databases for stakeholder use

- Ensure Applicant and other stakeholders have access to information generated during TBA by linking work products to the County or ARSG webpage.

- Work Assignment Closeout

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- Work Assignment Closeout

Do we need the boiler plate pre-requisite 25+ pages describing Colorado, the geology, natural history, historical features, etc. ???

DRAFT

Gladstone Treatment Plant Assessment
A Targeted Brownfield Assessment Project Proposal

PROJECT TITLE: **Gladstone Treatment Plant Assessment**

NAME, ADDRESS, PHONE, EMAIL OF LEAD PROJECT SPONSOR:
San Juan County, Box 466, Silverton, CO 81433
CONTACT PERSON: Willey Tookey
Phone: (970) 387-5766 **Fax**: **E-Mail**: sanjuancounty@frontier.net

Site/Project Location: Gladstone, Cement Creek Watershed, San Juan County, Colorado. See Vicinity Maps 1 & 2 of Appendix A.

Gladstone is the site of an historic mining town that developed in the 1870s (?) with the advent of mining in the surrounding area. The town declined in the xxxx, and today there are no remnants of the town. Numerous mills existed on the edges of the town, and the abandoned town site was used for disposal of mill tailings. The last operating mill in Gladstone closed in xxxx. Mining activities continued sporadically in the immediate Gladstone area until the early 1990s. The largest mine in the Animas Mining District was the Sunnyside mine that closed in the 1990s and is now nearing completion of final reclamation. The Gold King mine is currently in inactive status. Both these mines were partially accessed through the American tunnel that has its portal in Gladstone. Bulkheads were placed in this tunnel to stop water discharges. There continues to be a small discharge (100GPM compared to the peak discharge of 1,600 GPM) from the tunnel that is thought to be near surface groundwater. There is an existing 1980 vintage treatment plant that is subject to reclamation plans.

This Targated Brownfield Assessment (TBA) project includes assessing potential locations on both private and public lands for a modern centralized water treatment facility to replace the existing treatment plan. For this TBA, treatment plant location analysis is limited to an approximate 20 acre area in the immediate area Gladstone. The TBA project will also assess the practicality of conveying to the facility and actively treating acidic toxic metal discharge from several mines in the vicinity of Gladstone. Draining mines and easements for pipelines to transport drainage to the treatment plant may involve as many as 100 acres in less than a three square mile area.

There are a number of mine discharges to be considered for treatment in this TBA. Mines on patented mining claims include those under the control of Gold King Co., which are the Gold King, Mogul, Gran Mogul, and Red and Bonita mines. Mines on public lands include the American tunnel, Joe and John, and Eveline. All these mines are ranked as a high cleanup priority by the Animas River Stakeholders Group (approved by the Colorado Water Quality Control Commission). These mines have low volume/high metal concentration acid mine drainages that need to be considered for inclusion in the proposed treatment

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facility. In addition, there is the possibility of treating water from Cement Creek that is contaminated by mines further upstream.

Current assessment value of the patented mining claims is minimal because they are assessed for mining purposes. If discharges were treated, the property values would increase substantially as these private lands would be available for residential and/or commercial/industrial development. All mine drainages considered for treatment are within one and one half miles of the new and expanding Silverton Mountain ski area.

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Site History and Current Status

This TBA project involves assessment for pollution reduction of mine drainages from several patented mining claims, public lands, and the ghost town of Gladstone in the Cement Creek watershed, San Juan County, Colorado. Numerous historic, now abandoned, mines exist within a two mile radius of Gladstone. A few of these mines have acid mine drainage of flows between 30 and 100 GPM containing very high concentrations of acid and dissolved metals. Gladstone has historically been the central location, and railroad terminus, for the milling and shipping of mine ores from this three square mile valley. The portal of the American tunnel is in Gladstone, and it was originally the lowest level access to the Gold King mine. In the 1960's the American tunnel was extended several miles to access the Sunnyside mine from below. The tunnel drained up to 1600 GPM from the mine. All ore from the American tunnel was transported out of Gladstone until the mine's closure in 1992. Milling had already ceased in Gladstone before the 1960's and the Sunnyside ore was transported to the Mayflower mill near Silverton. Sunnyside Gold Corporation (SGC) has removed or is in the process of removing any remaining surface facilities, mine wastes, and tailings from historic mills (pre-1960) in Gladstone as part of their current reclamation permit termination requirements.

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The existing lime feed and settling pond type treatment facility was constructed in Gladstone in 1979 by SGC. The facility served to treat water discharging from the American tunnel, the main access into the Sunnyside mine, as required by their water discharge permit. Under jurisdiction of a court consent decree to terminate their discharge permit, SGC installed several bulkheads within the Sunnyside mine which has greatly reduced the amount of discharge out of the American tunnel. Seventy to 100 GPM continues to discharge presumably from near surface, "natural" ground water flows. All terms of the consent decree have been met by SGC except surface facilities, small amounts of mine waste and mill tailings. In January of 2003 the treatment facility and operations were transferred to Gold King Corp. Gold King continued to operate the treatment facility, treating the remaining American tunnel discharge, until September, 2003. Due to financial problems and the loss of the leased use of the property the settling ponds reside upon, Figure 1, the company quit treating the discharge. The treatment plant is presently sitting idle for lack of funds and an adequate method to separate and dispose of the metal precipitates.

Figure 1: Gladstone Treatment Plant - Settling Ponds 1

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Figure 2: Gladstone Treatment Plant - Limefeed

Discharge from the American tunnel is now considered non-compliant with the Clean Water Act, and the existing, first generation lime treatment plant, Figure 2, may or may not be adequate for future use depending upon the results of this proposed TBA engineering analysis for a modern and complete process. Gold King Corp. has no financial ability to operate the plant and the properties containing the lime feed plant and settling ponds have been foreclosed upon, subject to a reclamation period.

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Cement Creek, the receiving stream for the discharge of the American tunnel and other draining mines in the immediate area, is unable to support aquatic life and only ambient water quality standards apply. Cement Creek is a major contributor of metals and acidity to the Animas River which has "goal-based" cold water aquatic life I standards. Presently 15 TMDL's are not being met in Cement Creek and the Animas River below Cement Creek's confluence. Cement Creek is the primary remaining target for metals and acidity reduction, necessary to bring the Animas River into Clean Water Act compliance.

Technology for active treatment plants has advanced in recent years. If newer technologies were employed, improvement in cost efficiency of treatment and disposal of the removed metals could be realized. For instance, using the present lime feed system combined with a new smaller settling area, thickener, and filter press, a low volume solid brick of precipitates could be produced that could be disposed of in a more affordably way, such as in a landfill. The previous system hauled the sludge, containing 98% water, to an open tailings pond which is no longer available. On the other hand, the existing plant is a high volume minimal plant that may not achieve water quality standards but does remove a high total metal load from Cement Creek. An important objective in this TBA project is to maximize metal removal at minimal cost.

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Due to the non-compliant status of the existing dormant treatment plant, various property owners and Animas River Stakeholders Group (ARSG) participants are anxious to re-develop adequate treatment. The close proximity of the plant to high impact draining mines and the necessity to meet downstream water quality standard goals provides a significant opportunity for a collaborative approach that could be enormously beneficial to the entire watershed, including aquatic resources, recreational users, fisherman, irrigators, and the municipal water users of Durango, Aztec, and Farmington. A modernized treatment plant in the vicinity of Gladstone is likely to be the most cost efficient method of reducing metal and acidity loading to the Animas River watershed. This proposed TBA project would determine the feasibility of the concept of potentially combining drainages of several mines for treatment plus possible treatment of Cement Creek waters up to a maximum of 1,600 GPM, optimal treatment technologies for

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maximum metal load removal (not necessarily lowest metal concentrations), preliminary plant design, land acquisitions (if any) required, and capitol and operating costs.

No CERCLA or RCRA response action has been taken on any of the sites.

Property Specific Determinations

All draining mines throughout the Animas River watershed have been characterized and ranked with respect to one-another by their metals and acidity contributions by the Animas River Stakeholders Group (ARSG). Several of the worst polluters of metals and acidity were found to be in the vicinity of Gladstone and would be considered as drainages for treatment in this assessment. Characterization analysis and feasibility for remediation determinations have been compiled in the Animas Use Attainability Analysis[1] by the ARSG.

Contamination by Petroleum or Petroleum Product

No known petroleum or petroleum product contamination exists on the current treatment site. Cite Camille report. Remaining mining and milling wastes are to be removed by SGC in 2005.

While metal contamination in Cement Creek is high, it is due to a combination of natural geological processes and acid mine drainage from mines in the watershed. Contamination from metal mine processing (mine waste and mill disposals) in Gladstone is considered low to moderate. Sunnyside Gold Corporation (SGC) has already removed tens of thousands of tons of historical mine tailings and mine wastes and disposed of them in Tailings Pond #4 of the Mayflower mill. In 2005 SGC will complete their permitted remediation by removing the sludge in the settling ponds, any other mine wastes, and buildings in order to terminate their discharge permit. Although operators responsible for remaining mine discharges and low level contamination do not exist, land owners and participants in the ARSG process are interested in collaborating to find a practical way to make further improvements in water quality.

San Juan County, the sponsoring agency, is not liable for any contamination on the site.

Project Period and Budget

This project will begin soon after the grant award. ARSG has currently scheduled a special Remediation Work Group meeting for May 19th, 2005 to complete the development of objectives and tasks for the assessment, which will be provided to EPA and the chosen contractor. Appendix C, Draft Objectives and Tasks, lists project objectives and task; however these need to be further refined as many of the tasks have been partially or wholly completed.

[1] Simon, Wm., Butler, P., and Owen, R., 2001. Animas Use Attainability Analysis.

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Some of the initial assessment must be accomplished in the field. Field season at this high elevation site is restricted by heavy snow accumulations and avalanches. Field work is generally limited to May or June through October, depending upon seasonal conditions. All other project tasks can be accomplished in the office. The assessment and final report should be completed by July, 2006.

Budget:

Assurance of Future Redevelopment and Reuse of the Site

Any and all mine drainages piped into the plant will benefit from treatment. Therefore land values on the patented mining claims will increase and property owners will be able to use the property for development purposes whereas presently the liability associated with mine drainage inhibits investment. Treatment of mines on public lands will enhance recreational values, which in turn will benefit the local tourism industry.

OKAY TO HERE

During the period of this TBA assessment, the BLM and San Juan County have agreed to simultaneously complete an investigation on various legal aspects of ownership and future operation of the treatment facility. We anticipate a trust organiation or a quasi-public entity such as a special improvement district will own and operate the facility. The legal investigation will make recommendations on this critical aspect of the project.

San Juan County will lead this TBA project providing administrative oversight, project management, and a public forum. The Animas River Stakeholders Group initiated this project and will remain as key advisors to the Board of County Commissioners, the County Administrator, and the TBA contractor. ARSG has developed a list of objectives and tasks, to be refined in May 2005 that will focus the efforts of the chosen contractor. Through monthly public meetings, the ARSG will provide valuable public education and an avenue for public input. The BLM, Colorado Division of Minerals and Geology (DMG), and Colorado Water Quality Control Division among other local, State, and Federal agencies are active ARSG participants who will contribute expertise and project oversight and focus (Appendix A).

This TBA project has been openly discussed for several months at ARSG and Board of County Commission meetings. Our local newspaper has reported extensively on this proposal. Environmental advocacy groups and downstream water users are aware of the problems faced with the treatment plant being inoperative and will insist that positive steps be taken to bring discharges into compliance.

Although most funding sources will need to be identified after the feasibility determination, it is anticipated that many entities will need to be involved. The BLM has recently requested $3 million for treatment plant development and

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operation. Presently the BLM and San Juan County are committed to accomplish the legal assessment. The existing lime feed treatment facility, Figure 2, could be donated to the cause if we can act quick enough that it is not torn down as a requirement of the existing permit with DMG.

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Benefits

1) Increased property valuations from decreased contamination and liability from draining mines on the project and adjacent lands.
2) Reduced metal and acid loading to Cement Creek and the Animas River. An active treatment plant may presently be the most cost effective method of treating high concentration, low volume acid mine drainage. The possibility of treating several mine drainages in one unit plus perhaps waters from Cement Creek would be a significant step in the effort to meet TMDL's and water quality standards.
3) Significant health benefits would result from reduced metal concentrations for drinking water users in Durango, CO, and Aztec, Flora Vista, and Farmington, NM.
4) Development of a long term secured treatment facility would free other potentially available lands for commercial/residential development near the base of Silverton Mountain Ski Area. A substantial increase in winter recreational/tourist use would result.
5) Public lands would benefit from reduced metals pollution to area streams and wetlands. Aquatic life and aesthetic values would increase. Treatment of acid mine drainage would help restore the integrity, functions, and water quality of receiving streams and adjacent wetlands.
6) ARSG, San Juan County, and Silverton Mountainn Ski area are all involved in trail development in the Gladstone corridor. The corridor has been targeted by the San Juan Planning Commission as a development corridor. The County has little room elsewhere to grow as this valley bottom is one of the few locations in the county that are accessible by motorized vehicles. The County and ARSG are presently involved with the Animas Conservancy in developing potential conservation easements for Gladstone and elsewhere in the County.
7) San Juan County is the poorest in the State and has the highest unemployment. This project will eventually provide local construction and operation and maintenance jobs.

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APPENDIX A

State and Federal Participants

BLM	Mine inventory, site characterization of BLM lands, development of pilot projects
BOR	Continued geochemical monitoring, site feasibility, remediation plan engineering
CCEM	Facilitator of the stakeholder process
CDMG	Site feasibility, remediation plan development, process engineering, 319 hydrological control remediation project in Mineral creek, Cement creek feasibility studies
CDOW	Biological surveys, development of bio-monitoring methodology, Riverwatch program
RIVERWATCH	Continued water monitoring (chemical analysis by DOW)
SWCD	(Southwest Water Conservation District) Funding for water monitoring, natural background loads, coordinator ' s position
USFS	Mine inventory and site characterization of FS lands, survey of Mineral creek priority sites
USGS	Water monitoring, studies to determine metal loading resulting from natural geologic processes, stream sediment transport and colloidal fate studies
WQCD	Water chemistry monitoring, statistical analysis, data base processing, GIS development

OTHER PARTICIPANTS

Animas Water Company	Salem Minerals	Steve Fearn, P.E.
City of Durango+	San Juan County +	Sunnyside Gold Corp.+
Friends of the Animas River	San Juan RC&D	Town of Silverton+
Gold King Mining Corp.	Shenandoah Mining Corp.	Tuscoe, Inc.
Mining Remedial Recovery Co.*	Silver Wing Mines+	

* This company completed a mine drainage control demonstration project in the late summer of 1995 using private funds, supplemented by NPS 319 funding.

+ Providing financial support for the ARSG process

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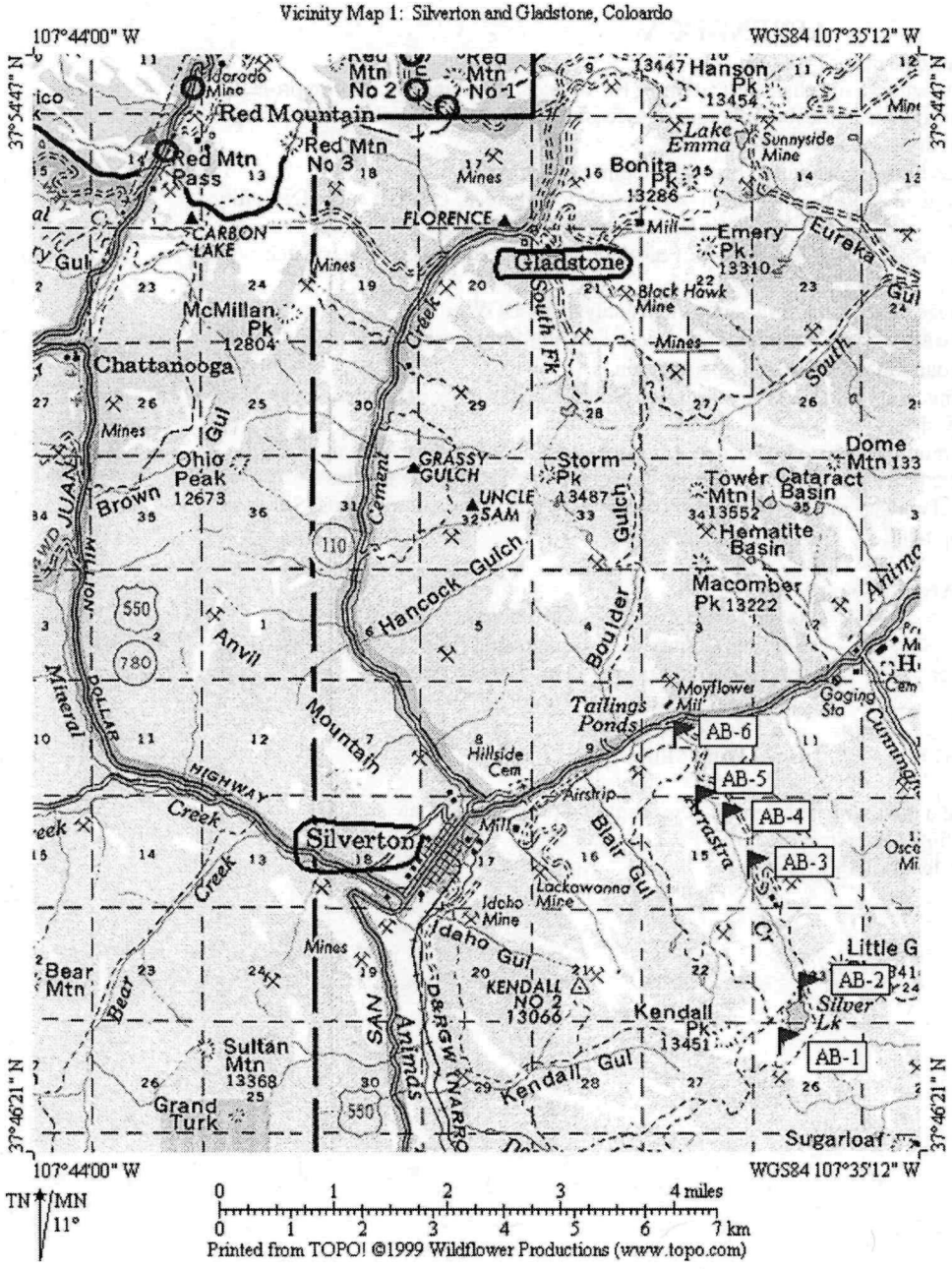
Vicinity Map 1: Silverton and Gladstone, Coloardo



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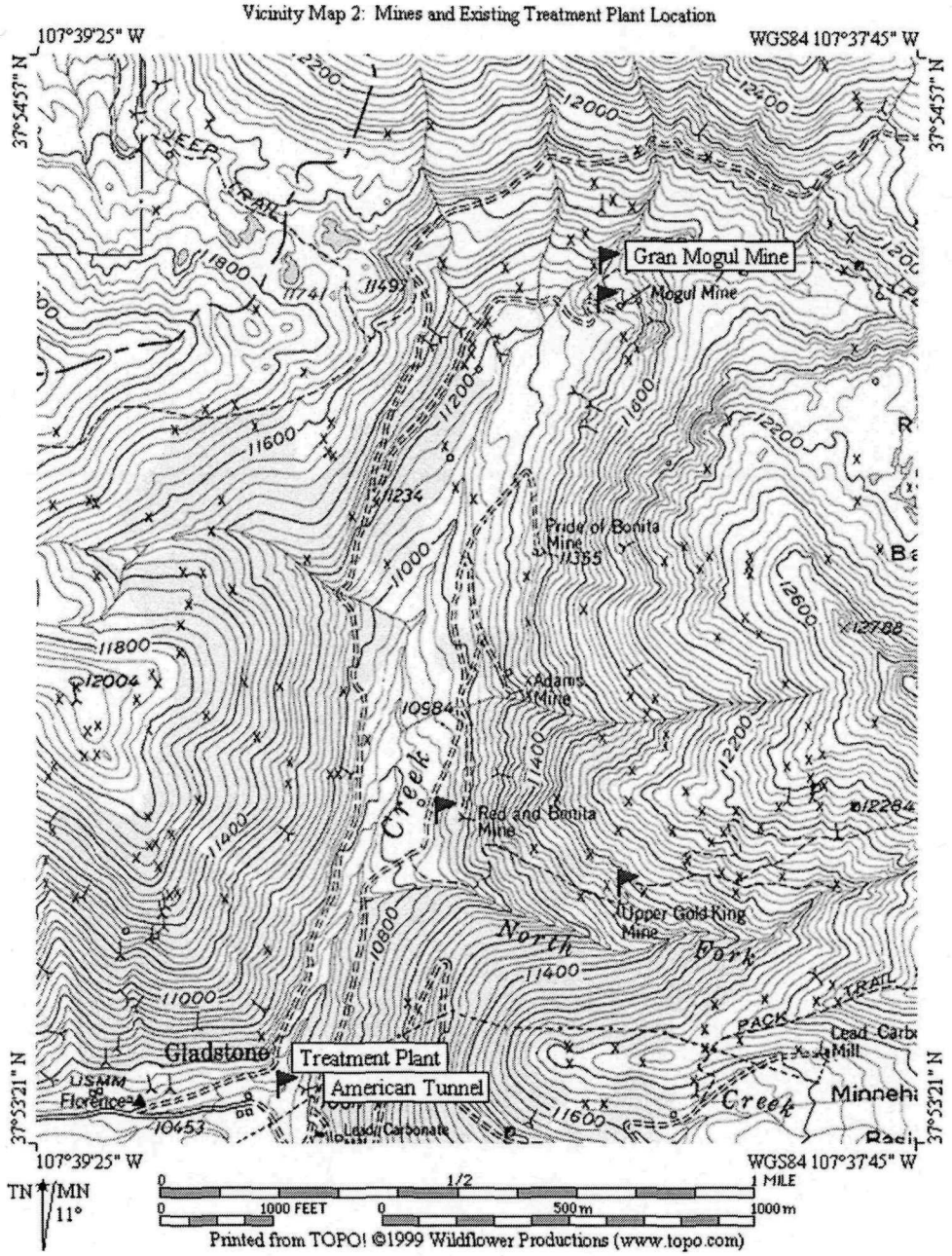
Vicinity Map 2: Mines and Existing Treatment Plant Location



Appendix C, Draft Objectives and Tasks